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paratus is so constructed that the siphon may be easily removed, and when the extraction is concluded the removal of the siphon and the substance will usually give abundant space to collect the solvent. It is then distilled off from the extract and collected in the pocket. The drying of the extract must be completed in a current of hydrogen, as usual.

This extractor was designed for the quantitative analysis of feeding-stuffs; the side-pocket to contain the substance is therefore made small in our instruments so as to require but little of the absolute ether and to insure quick siphoning. It is, however, apparent that within certain limits the extractor might be made of considerable size.

Our extractors are heated by one water bath; each flask is supported by a spiral spring which has a piece of brass gauze soldered across the upper coil. The spring should be rather stiff, but so adjusted in length as to require but little compression to bring it under the flask.

NOTE.—Mr. J. T. Crawley, in the Am. Chem. Journal, Vol. XI, p. 507, has described an apparatus employing capillary attraction to bring the siphon into action. It is only fair to say that our extractor was designed before the publication of his article.

ANNUAL PRECIPITATION OF RAIN AND SNOW AT MANHATTAN, KANSAS, FOR THE PAST THIRTY-TWO YEARS.

BY C. M. BREESE, MANHATTAN.

The rainfall is often of a local character, so that the measured amount at any one place may hold good for but a limited area. The rainfall at Manhattan, as shown by the accompanying chart, is not claimed to be more than an indication of the precipitation over the rest of the State.

In any agricultural country where the system of irrigation is not practiced, the question of the rainfall and its distribution is one of vital interest — especially that of the distribution. To illustrate: In 1886, 1887 and 1888, the rainfall was about the average, but the crops were poor, being affected by drouth at important periods of growth, and by chinch-bugs. The rainfall of 1889 was a trifle less than that of 1888, and only one inch more than that of 1887, but the crops were excellent. The difference in the distribution of the moisture tells the tale. Again, in 1875 there was a very scanty rainfall, but it was exceedingly well distributed, and I find Riley county is accredited with a wheat crop averaging 14 bushels per acre, corn 41 bushels, oats 28 bushels, and potatoes 90 bushels — pretty good crops for a year when the total precipitation was only 18.16 inches.

"Is the rainfall of Kansas increasing?" Let us examine the record: In the thirty-two years covered there are fourteen above the average, and eighteen below. Dividing the record into two equal periods of time, we find there are in the first half six years above the average, and ten below, while in the second half there are eight above and eight below. The total precipitation for the first half, or previous to 1874, was 468.15 inches, or an annual average of 29.26 inches, while subsequent to and including 1874 there was a precipitation of 508.02 inches, or an average of 31.75 inches, and a difference in favor of the latter period of 2.5 inches per annum. But let us suppose that, instead of extending over thirty-two years, our record had commenced in 1870, and included but twenty years, and we now divide into two equal parts: The total precipitation for the first half is 311.45 inches; for the second, 309.27

inches: *which makes a difference in favor of the first half of .218 inch per annum.* Suppose we divide the period into quarters—

	Total rainfall.	*Yearly average.*
First quarter	245.16	30.645
Second quarter	222.99	27.874
Third quarter	257.08	32.12
Fourth quarter	250.94	31.36

This shows an excess in the third quarter, and a deficiency in the second—surely nothing like what we would expect if we are getting a regular increase in our rainfall. "Is the rainfall increasing?" I hope so, truly, but am free to say I don't know. I don't believe the record proves either that or the converse.

As regards the popular idea that we have a rainfall cycle of seven years, this record does not show that either. It will be noticed that the period from the beginning of the record up to 1866 was very irregular, was one of ups and downs, alternate years being on opposite sides of the average line. Then comes a cycle of seven years, from 1865 to 1872; then another of four years; then one of seven years again, and then one of uncertain duration not finished yet, and which, including 1890, is eight years old and still on the downward trend. The record shows a variation that I think proves nothing, excepting that there is no periodic law that can be depended on in the rainfall at Manhattan.

The greatest rainfall for any one month was for July, 1878, being 12.71 inches.

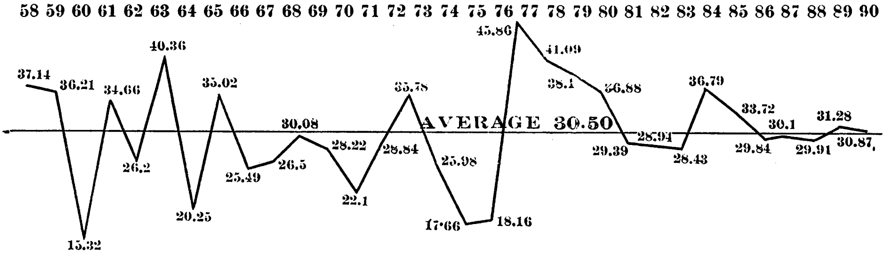
The monthly means, in inches, are as follows:

January	.75	May	3.93	September	3.19
February	.98	June	4.39	October*	2.23
March	1.16	July	4.65	November	1.47
April	2.75	August	3.86	December	.87

This table shows a gradual and steady increase from January, the month of least precipitation, to July, that of the greatest, and from then a steady decrease.

The diagram below exhibits clearly the variation in the rainfall at Manhattan.

RAINFALL AT MANHATTAN, KANSAS, 1858–90.



WIND VELOCITY AT MANHATTAN, KANSAS.

BY C. M. BREESE.

The record of the wind velocity at Manhattan only extends back to February, 1889.

The upper curve shown in the diagram shows the mean velocity of the wind for each hour of the day during the first nineteen months of the record. The figures 1,

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*These means include the first ten months of 1890, and consequently their sum does not exactly agree with the average of the chart.